

(2) A letter from Volta to Prof. Barletti, of Pavia, dated April 18, 1777, containing an anticipation of the electric telegraph. Volta suggests the possibility of connecting Milan and Como with a wire suspended from poles, so that an operator at one end of the line could fire an electric pistol at the other.

(3) A manuscript dated May 14, 1782, dealing with animal electricity.

(4) Volta's paper of March 20, 1800, announcing his discovery of the electric pile to Sir Joseph Banks, President of the Royal Society.

(5) Volta's monograph on the formation of hail, published about 1806.

The apparatus exhibited illustrate Volta's inventions of the electrophorus and the "electric pistol," his application of gas to lamps, combined with an electric gas-lighting apparatus, his invention of the eudiometer, his researches on the capacity of condensers, his condensing electroscope, his investigations on the law of electrostatic force involving the use of the electric balances and the electrometer, his researches on atmospheric electricity, his studies on the expansion of gases, his first forms of voltaic pile, including the columnar pile represented by several examples, also the "crown of cups," and his early experiments on electrolysis. A number of batteries of Leyden jars, electrostatic machines, and other apparatus used by Volta in his experiments, while not referring to any special advancements in science, go far towards giving us an insight into the thoughts and pursuits of a physicist of a century ago, of whom the people of Como feel justly proud.

G. H. BRYAN.

UNITED STATES GEOLOGICAL SURVEY.

THE literature of American geology increases at an almost overwhelming rate. We have just received three large volumes containing 2053 pages of letterpress, including Part ii. of the Eighteenth Annual Report of the Survey for 1896-97, being papers chiefly of a theoretical nature; and Part v., the Mineral Resources, in two volumes. We have already called attention in NATURE for May 4 to some of the papers contained in Part ii., of which we received advance copies; these were on "The Triassic Formation of Connecticut," by W. M. Davis, with coloured maps and sections; on the "Geology of the Edwards Plateau and Rio Grande Plain adjacent to Austin and San Antonio, Texas, with reference to the occurrence of underground waters," by R. T. Hill and T. W. Vaughan; and "A Table of the North American Tertiary Horizons, correlated with one another and with those of Western Europe, with annotations," by Mr. William H. Dall.

In addition, this volume contains a report on the "Glaciers of Mount Rainier," by I. C. Russell, with a paper on "The Rocks of Mount Rainier," by G. O. Smith. Associated with the Cascade range in the State of Washington, but of later date and distinct from it both geographically and geologically, are four prominent volcanic mountains, of which one is Mount Rainier, 14,526 feet in height. This mountain is an extinct volcano, but the residual heat of its once molten rocks gives origin to steam-jets, which escape from crevices in the now partially snow-filled craters at the summit. The main mass consists of fragmental andesitic and basaltic materials, with some lava streams; but its outlines have been modified by frost and storms, and deeply sculptured by glaciers. The glaciers are now receding. The scenery around the mountain possesses such great beauty and grandeur that a portion of ground was reserved as a National Park in 1893, and it is now intended to reserve a larger area. Numerous views of the scenery are given.

"The Age of the Franklin White Limestone of Sussex County, New Jersey," is discussed by J. E. Wolff and

A. H. Brooks. This limestone occurs in the Pre-Cambrian or Archæan highlands of New Jersey, an area largely occupied by gneisses. These schistose rocks have a nearly constant north-east strike and south-east foliation-dip, with a frequent linear parallel structure which is usually "inclined at a moderate angle to the north-east, lying generally in the plane of dip, and is called 'pitch.'" It is observed that the foliation structure in the limestone is usually parallel to that in the gneiss, and "the pitch structures of the gneiss, white limestone, and associated [magnetite] ore deposits have a general parallelism both in direction and angle." Mr. Wolff regards the pitch-structure as due to primary crystallisation. The authors conclude that the white limestone was deformed, metamorphosed, and partly eroded before the basal member of the Cambrian series was laid down.

"A Geological Sketch of San Clemente Island" is contributed by W. S. T. Smith. This island is the southernmost of a group known as the Channel Islands, which lie off the southern coast of California. It has no permanent human inhabitants except one old man, who has lived there most of the time for the last thirty years. Sheep, cattle and wild goats have been introduced, and there are foxes, lizards and land-shells. The vegetation is limited almost entirely to low shrubbery and herbage. The cactus and "salt-grass" are abundant. The island has a length of nearly twenty-one miles, a maximum width of little over four miles, and an altitude at one point of nearly 2000 feet. It is built up almost entirely of lava flows, with intercalated volcanic breccias and ashes. A detailed account of these is given. Miocene and later sedimentary deposits occupy small areas. The volcanic rocks appear to have been of Miocene age, but older than any of the sedimentary deposits. Attention is drawn to the evidence of faulting which occurred between the close of the Miocene and early Pliocene times, and which has had a marked effect on the physical features of the island. This faulting has continued at intervals ever since.

"The Geology of the Cape Cod District" is described by N. S. Shaler. He discusses the series of geological events which occurred since the beginning of the Cretaceous period in the south-eastern portion of New England. After tilting and the erosion of the Cretaceous and Tertiary beds, various Pleistocene deposits were laid down, and these in turn became somewhat disturbed. The region, in fact, has evidently been one of remarkable instability. A very full and interesting account is given of the structure of the region and of the glacial and post-glacial phenomena, illustrated by numerous views and sections.

"Recent Earth Movement in the Great Lakes Region" is the title of an article by G. K. Gilbert. He points out that although modern movements are of small amount, it is believed that they are of the same kind as the ancient, and that the great changes of the geologic past were effected slowly. His observations now lead to the conclusion that the whole North American lake-region is being lifted on one side or depressed on the other, so that its plane is bodily canted towards the south-south-west, and that the rate of change is such that the two ends of a line 100 miles long and lying in a south-south-west direction are relatively displaced four-tenths of a foot in 100 years. The changes are not directly obvious owing to inequalities of rainfall and evaporation, but the mean height of the lake-surfaces has been affected. With reference to the economic bearings of these changes Mr. Gilbert remarks that the modifications are so slow that they may have small importance in engineering works. He observes, however, that it is a matter of greater moment that cities and towns built on lowlands about Lakes Ontario, Erie, Michigan, and Superior will sooner or later feel the encroachment of the advancing

water, and it is peculiarly unfortunate that Chicago, the largest city on the lakes, stands on a sinking plain that is now but little above the high-water level of Lake Michigan.

The two volumes on mineral resources contain a large amount of valuable information, much of it statistical. The products for 1896 showed only a slight increase in value over those for 1895. There are lengthy reports on iron-ores, on the iron and steel industries of all countries, and on the Witwatersrand banket and other gold-bearing conglomerates, most of which appear to be marine. The evidence given in reference to these auriferous deposits shows that in ancient formations the detrital gold is most likely to be found in marine shore deposits. There are shorter reports on copper, lead and zinc, on aluminium with references to bauxite from Georgia and Alabama, on quicksilver, manganese, nickel, cobalt, antimony, and platinum; 163 ounces of platinum were obtained in the United States, and it is mentioned that a nugget weighing 20 ounces was found in Columbia, South America. Coal and coke are treated very fully, so also are petroleum and natural gas. Building-stones, clays, cement, precious stones, phosphates, mineral paints, and a variety of other substances are dealt with. It is noted that black shale is ground for the pigment known as mineral black. Fuller's earth has been reported from a number of localities. Observations have been made on various limestones considered likely to be useful for lithography, and it is reported that South Dakota promises to furnish suitable stone. The final report is devoted to mineral waters.

THE REPORT OF THE INTERNATIONAL AERONAUTICAL SOCIETY.

THE International Meteorological Conference of Paris, 1896 (*NATURE*, vol. liv. p. 523) appointed various committees to discuss and report on certain scientific questions. One of these committees was entrusted with all questions connected with the science of aeronautics, such as the scientific use of balloons and kites.

Of this committee, Dr. H. Hergesell of Strassburg was the chairman, and Dr. W. de Fonvielle the secretary.

The committee held a meeting at Strassburg, March 31–April 4, 1898, and the report of this meeting, in two languages—German and French—has just appeared.

The meeting was attended by some twenty-five gentlemen, for the most part original or co-opted members of the committee.

During the interval of eighteen months between the meeting in Paris and that at Strassburg, several concerted balloon ascents had been organised and carried out. The area over which balloons, either manned or simply fitted with registering apparatus, had been sent up, extended from St. Petersburg to Paris, and a fair number of balloons took part on each occasion.

The chief business of the Strassburg meeting was to receive and consider the reports of these concerted experiments, and from the experience gained to arrive, if possible, at improvements in apparatus and arrangements for future work.

Among other matters, the preparation of sufficiently sensitive thermographs, to register sudden alternations of temperature, was especially recommended, and also the use of liquid air for the purpose of testing thermometers liable to exposure to extreme temperatures in unmanned balloons.

An interesting paper by Mr. Rotch on his kite work at Blue Hill Observatory, Massachusetts, was also handed in and included in the report.

Various special reports will be found in the appendices.

NO. 1547, VOL. 60]

NOTES.

A DEPUTATION will wait upon Mr. Balfour to-day to place before him reasons why national support should be given to an Antarctic expedition. It is understood that the Government is favourably inclined to the views of the deputation, and that the intention to make a grant towards the cost of the proposed expedition will be announced.

PROF. E. A. SCHÄFER, F.R.S., has been elected successor to the late Prof. Rutherford in the chair of physiology in the University of Edinburgh. Prof. Schäfer is forty-three years of age, and he has been Jodrell professor of physiology in University College, London, since 1863, when he succeeded Sir J. S. Burdon Sanderson.

THE annual conversazione of the Royal Society took place yesterday evening as we went to press.

SIR W. H. WHITE, K.C.B., F.R.S., will receive the freedom of the borough of Devonport on July 20, and will unveil, at the Technical School, a window descriptive of naval architecture.

DR. W. F. HUME, who during the last eight months has been carrying out a geological and topographical survey of the peninsula of Sinai, under the auspices of the Egyptian Government, has returned to Cairo with his survey party.

DR. CYRUS ADLER contributes to *Science* of June 2 and 9 a detailed account of the proceedings of the second conference on the International Catalogue of Scientific Literature, held at the Royal Society last October. The official Acta of the conference appeared in *NATURE* of October 27, 1898 (vol. lviii. p. 623).

M. PH. VAN TIEGHEM, Professor at the Museum of Natural History and President of the French Academy of Sciences, has been appointed to the chair of Biology of plants cultivated in France and the Colonies at the National Agronomic Institute, Paris; and M. G. Poirault succeeds the late M. Naudin as Director of the Laboratory for Higher Instruction at the Villa Thuret, Antibes.

PROF. ALFRED GIARD, the president of the section of zoology, anatomy, and physiology of the French Association for the Advancement of Science, has issued a circular in which he points out that as zoological members of the British Association will visit Boulogne, and attend some of the meetings of the French Association, the meeting will afford a good opportunity of discussing questions referring to pisciculture and marine fisheries. Papers dealing with the special zoology of the Channel or of the North Sea are therefore especially invited.

THE International Hydrographic and Biological Congress, which is to discuss the arrangement of periodical researches into the conditions of the North Sea and North Atlantic, was opened at Stockholm on Thursday last. M. Krusenstjerna, Minister of the Interior, delivered a speech, in which he welcomed the delegates in the name of the King of Sweden and Norway. Director-General Akermann (Sweden) was chosen president of the congress.

THE Liverpool School of Tropical Diseases is sending out to the West African coast a special expedition to investigate the causes of malaria and other diseases. The expedition will be headed by Major Ross, the recently-appointed lecturer, and will include Dr. Sunnett, the demonstrator to the Liverpool School. The party will start for Sierra Leone early in August, when the malarial season is at its height, and the conditions are most favourable for research. The expedition hopes to determine, by the methods which Major Ross employed in India,